



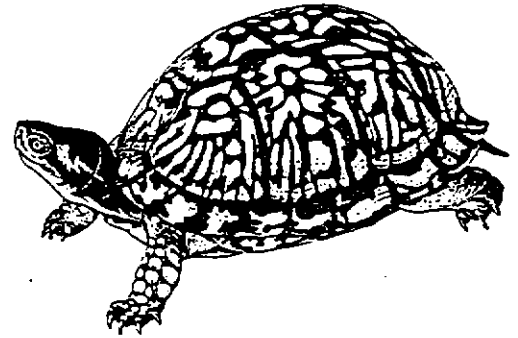
Natural Heritage & Endangered Species Program

Commonwealth of Massachusetts
Division of Fisheries & Wildlife
Route 135
Westborough, MA 01581
(508) 792-7270

MASSACHUSETTS SPECIES OF SPECIAL CONCERN

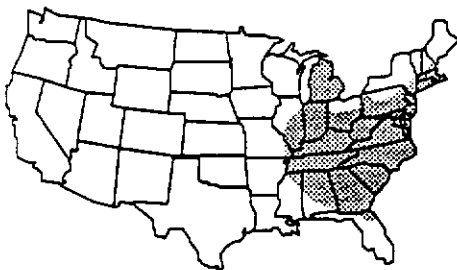
Eastern Box Turtle (*Terrapene carolina carolina*)

DESCRIPTION: The Eastern Box Turtle is a small, terrestrial turtle ranging from 11.4–20.3 cm (4.5–8 in.) in length. It is so named because it is the only North American turtle that when threatened is able to enclose head, legs, and tail completely within the protective armor of its upper (carapace) and lower (plastron) shells. The adult box turtle has a short, broadly oval, high dome shell with variable markings and coloration. The carapace is usually dark brown or black with numerous irregular yellow, orange, or reddish spots, blotches, or stripes in each carapace shield. The plastron may be tan to dark-brown or black, patternless or variably patterned light and dark—almost a mottled pattern of dark brown/black or tan/yellow; its surface either concentrically ridged or smooth; and divided into two movable portions by a strong hinge. The head, neck, and legs also vary in color and markings but are generally dark with orange or yellow mottling. The Eastern Box Turtle has four toes on its hind feet; a short tail; and an upper jaw ending in a down-turned beak.



DeGraaf, Richard M. and Rudis, Deborah D.
Amphibians and Reptiles of New England.
Amherst, Massachusetts: The University of
Massachusetts, 1983.

Although there are no striking sexual differences between the male and female Eastern Box Turtles, there are, however, external features that generally distinguish between the male and female. The male box turtle usually has bright-red to red-orange eyes, with those of the female being gray-brown, yellowish-brown or very dark-red. The rear lobe of the male plastron is concave, and that of the female is flat or slightly convex. The hind legs of the male are heavier and the claws stouter, shorter and more curved than the female. Males have longer, thicker tails, with the vent located farther from the shell and closer to the tip of the tail than the female. Both sexes are generally mild-mannered.



Range of the Eastern Box Turtle



Distribution in Massachusetts
Since 1978

Hatchlings have a flat, brownish-gray carapace with a yellow spot on each large scute; and yellow along the outer rim of the carapace, the mid-dorsal keel, and the lower mandible. The plastron is yellow to cream-colored with a black central blotch and yellow margining along the outside edge. The plastral hinge is not functional and poorly developed. The tail is long in comparison with that of the adult. Hatchlings, if molested, emit a strong odor to repel predators; an adaptation that is lost later on.

SPECIES SIMILAR IN MASSACHUSETTS: The Blanding's Turtle (*Emydoidea blandingi*) is the only species of turtle in Massachusetts that resembles the Eastern Box. Often referred to as the "semi-box turtle," the Blanding's Turtle has a hinged plastron enabling the turtle to pull its exposed part upwards towards its carapace but with less closure than in the Eastern Box Turtle. Outside of this specific adaptation, there is little or no similarity either in appearance or behavior between the two species. The Blanding's Turtle is essentially aquatic whereas the Eastern Box Turtle is terrestrial.

RANGE: The range of the Eastern Box Turtle is from southeastern Maine; south to northern Florida; and west to Michigan, Illinois, and Tennessee. Although the Eastern Box Turtle occurs almost statewide in Massachusetts, the majority of the population occurs in the southeastern section of the Bay State, just west of Cape Cod.

HABITAT IN MASSACHUSETTS: The Eastern Box Turtle is a woodland species, although in the northeast it also occurs in pastures and marshy meadows. It is found in both dry and moist woodlands, brushy fields, thickets, marshes, bogs, stream banks, and well-drained bottomland. It prefers open deciduous forests but has also been found on mountain slopes in Massachusetts. In optimal habitats in Cape Cod pine barrens and oak thickets, the species is generally associated with cranberry dominated swales interspersed with bearberry ground cover, low bush blueberries, and thickets of bracken fern.

LIFECYCLE/BEHAVIOR: The Eastern Box Turtle usually hibernates in the northern parts of its range from late October or November until sometime in April. In the deep south, it may remain semiactive throughout the winter. Hibernation generally begins at the time of the first killing frost. As many as four box turtles may share the same winter quarters, which range in type from loose soil, sand, vegetable debris and mud bottoms of ponds or streams to animal burrows or stump holes. As soil temperatures drop, the turtles burrow into the soft ground for a depth of from three inches to two feet. Females tend to hibernate first, with the males lingering to ensure that all females have been fertilized. They normally emerge from hibernation in April, but some individuals may emerge prematurely during warm spells in winter and early spring and perish from exposure.

Mating may take place as soon as the turtles emerge from hibernation or at any time until they enter hibernation again. Courtship begins with the male circling the female and biting at her shell, head, and legs, before mounting. Females nest from May to July and can lay fertile eggs up to four years after a single mating. Nesting areas may be in hay fields, roadsides, cultivated gardens, lawns, beach dunes, and woodland, and around house foundations. The eggs are deposited in a flask-shaped nest dug by the female's hind feet in loose soil at an elevated site, usually in an open area in close proximity to the previous years' nest. Egg laying occurs during the late afternoon-early evening and continues for up to five hours. Three to eight (usually four or five) thin, white, elliptical eggs are deposited by the female at intervals of one to six minutes; arranged in the nest by the hind feet; and then covered with soil by the hind legs and plastron. After the eggs are covered, the female crawls away, leaving the eggs unattended to incubate. The incubation period depends on soil temperature but generally the hatchlings emerge about 87-89 days after laying, usually in September. They may overwinter in the natal nest and emerge the following spring.

During the first four or five years of life, box turtles may grow at a rate of from half an inch to about three-quarters of an inch a year. Sexual maturity is thought to occur later in New England than in its southern range and may take up to 10 years to attain. It is believed that full growth is reached in about 20 years. The average life expectancy of a box turtle is between 40 and 50 years, but evidence shows that they can live as long as 80 to 123 years.

The Eastern Box Turtle is omnivorous, showing marked changes in food preferences from youth to maturity and from season to season. When young, it is chiefly carnivorous, feeding on insect larvae, slugs, earthworms, snails, spiders, crayfish, millipedes, fish, frogs, salamanders, a small percentage of vegetable material, and even carrion. At

approximately six years of age, box turtles develop a fondness for fungi (primarily mushrooms), berries, fruits, leafy vegetables, roots, stems, leaves and seeds. The adults take animal food with less frequency than young turtles.

In summer, adult box turtles are most often encountered in open woodlands in morning or evening, particularly after a rainfall. To avoid the heat of the day, they often seek shelter under rotting logs or masses of decaying leaves, in mammal burrows, or in mud. Though known as "land turtles", in hottest weather they frequently enter shaded shallow pools and puddles and remain there for periods varying from a few hours to a few days. In the cooler temperatures of spring and fall, box turtles forage at any daylight hour. They are diurnal, and scoop out a "form" (a small domelike space) in leaf litter, grasses, ferns, or mosses where they spend the night. These forms are often used on more than one occasion over a period of weeks. Juvenile box turtles are rarely seen. Immediately after hatching they seek a swamp or pond and immerse themselves in sphagnum moss or mud, remaining well hidden.

The home ranges of box turtles of all ages and both sexes overlap. The turtles frequently occur together and show no antagonism over territorial domain. Movements within the home range vary from random meanderings to fairly direct traverses. Occasional trips outside the range are made by some individuals; these trips include searches for nesting sites. Most adults show some homing tendency over short distances, such as a kilometer or two, but long distances as a result of human interference usually kills them. They orient themselves by the sun and rely on their vision for guidance and mobility. They have very defined home ranges averaging about 100 to 225 meters (100 to 750 ft.) in diameter. Some individual are transient and do not establish home ranges.

POPULATION STATUS: The Eastern Box Turtle has been declining in numbers throughout its range in Massachusetts and is presently listed as a "Species of Special Concern" in this state. Since 1978, only 187 sightings have been reported to the Natural Heritage and Endangered Species Program, with heaviest concentrations in the southeastern part of the state and Cape Cod. Many of the sightings are road crossings or single individuals making it difficult to estimate the size of the population. There are several reasons for this decline: habitat destruction resulting from residential and industrial development and concurrent dissection of the landscape with roads; deliberate and inadvertent highway mortality; collection by individuals for pets; destruction of nests and young by skunks, coyotes, foxes, crows, dogs, and raccoons; and genetic degradation of the native stock by imported captives that escape or are released.

MANAGEMENT RECOMMENDATION: The greatest threat to the survival of the Eastern Box Turtle in Massachusetts is the fragmentation and destruction of its habitat. The bisection of its habitat by roads can reduce or destroy populations. Due to the decline of farming in Massachusetts, agricultural land is being returned to woodland. A mixture of regeneration, selective cutting and even selective burning of woodland may be beneficial to the Eastern Box Turtle. Large roadless areas of optimal habitat need to be preserved, especially in the Box Turtle's stronghold of Cape Cod. Though a law exists to protect against the importation, transportation, and release of wild animals in Massachusetts, this law, and the biological reasoning behind it, need exposure and publicity in the community at large, as well as enforcement. To ensure the long term survival of the Eastern Box Turtle, protection of its habitat is needed, as is education of the public about the detrimental affects of removing turtles from their natural habitats and keeping them as pets. Enforcement of the Massachusetts Endangered Species Act prohibiting the killing, molestation, and possession of the Eastern Box Turtle must also be improved. People should be encouraged to help box turtles across roads (always in the direction the animal is heading), and should be made aware that box turtles should never be transported or captured as pets. Finally, the practice of releasing non-native box turtles must be discouraged to protect the genetic integrity of native populations.

BIBLIOGRAPHY

EASTERN BOX TURTLE (*Terrapene carolina carolina*)

- Babcock, H.L. Turtles of the Northeastern United States. New York: Dover Publications, 1971.
- Cinst, C.H. and Barbour, R.W. Turtles of the United States. Lexington: University Press of Kentucky, 1972.
- Conant, Roger and Collins, Joseph T. A Field Guide to Reptiles and Amphibians—Eastern and Central North America. Boston: Houghton Mifflin Company, 1991.
- DeGraaf, Richard M. and Rudis, Deborah D. Amphibians and Reptiles of New England. Amherst, Massachusetts: The University of Massachusetts, 1983.
- DeGraaf, Richard M. and Rudis, Deborah D. New England Wildlife: Habitat, Natural History, and Distribution. General Technical Report NE-108. Broomall, Pennsylvania: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station, 1986.
- Hunter, Malcolm L., Jr.; Albright, John; and Arbuckle, Jane, Ed. The Amphibians and Reptiles of Maine. Bulletin 838, The Maine Amphibian and Reptile Atlas Project. Orono, Maine: University of Maine, Maine Agricultural Experiment Station, July 1992.
- Lazell, James. Reptiles and Amphibians of Massachusetts. Lincoln, Massachusetts: Massachusetts Audubon Society, 1974.
- Lazell, James. "Nantucket Herpetology," Massachusetts Audubon, 1969, 54 (2): 32-34.
- Shiffer, Clark N. "Turtle In A Box," Pennsylvania Angler, November 1990, pp. 23-24.
- Simmons, Tim. "All Outdoors," Vineyard Gazette, February 5, 1988.
- Tyning, Thomas F. A Guide to Amphibians and Reptiles. Boston: Little, Brown and Company, 1990.